July 2013 version

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.
Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.
Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. **Project title: 3M B229 Parking Ramp Project EAW**

2. **Proposer:**
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Project Leader
3M Center Resident Engineering
3M Center, 216-3S-18
Saint Paul, MN 55144-1000
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Email: macarlson-lenzmeier@mmm.com

3. **RGU**
Michael Martin
Economic Development Coordinator
City of Maplewood
1830 County Road B East
Maplewood, MN 55109
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Email: michael.martin@maplewoodmn.gov

4. **Reason for EAW Preparation:** (check one)

Required:	Discretionary:
☐ EIS Scoping	☐ Citizen petition
X Mandatory EAW	☐ RGU discretion
	☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

Response: Minnesota Rules 4410.4300 Subpart 14(B) – Construction of a New or Expansion of Existing Industrial, Commercial, or Institutional Facility

5. **Project Location:**
County: Ramsey
City/Township: Maplewood
PLS Location (¼, ¼, Section, Township, Range): Section 36, Township 29N, Range 22W
Watershed (81 major watershed scale): #20 – Upper Mississippi Watershed, Twin Cities
GPS Coordinates: Latitude: 44d57'06"N; Longitude: 92d59'52"W
Tax Parcel Number: 36.29.22.24.0005

At a minimum attach each of the following to the EAW:
- County map showing the general location of the project;
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and

- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.

6. Project Description:

a. Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).

Response: 3M Company is proposing to demolish an existing parking ramp (including 1,556 parking spaces) and construct a new 4-level parking ramp in the same location. The new ramp will include approximately 1,866 stalls. The project will also include an adjacent surface parking lot.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

Response: The existing parking ramp on the site will be demolished in two phases, and the materials (mainly concrete) will be recycled or disposed safely in a licensed landfill. The ramp site will be cleared and graded as needed to accommodate the new parking ramp and surface parking lot. The footprint of the new ramp is approximately 150,000 square feet, and the ramp will include four levels of parking. Demolishing the existing ramp and constructing the new ramp will take approximately 15 months.

The preconstruction project site with the existing ramp is shown on Figure 3. The post-construction site is shown on Figure 4.

c. Project magnitude:

Total Project Acreage	8.5 Acres
Linear project length	N/A
Number and type of residential units	N/A
Commercial building area (in square feet)	N/A
Industrial building area (in square feet)	
Institutional building area (in square feet)	
Other uses – specify (in square feet)	Parking Ramp total square footage is approximately 600,000 sq. ft.
Structure height(s)	4 levels (55 feet)

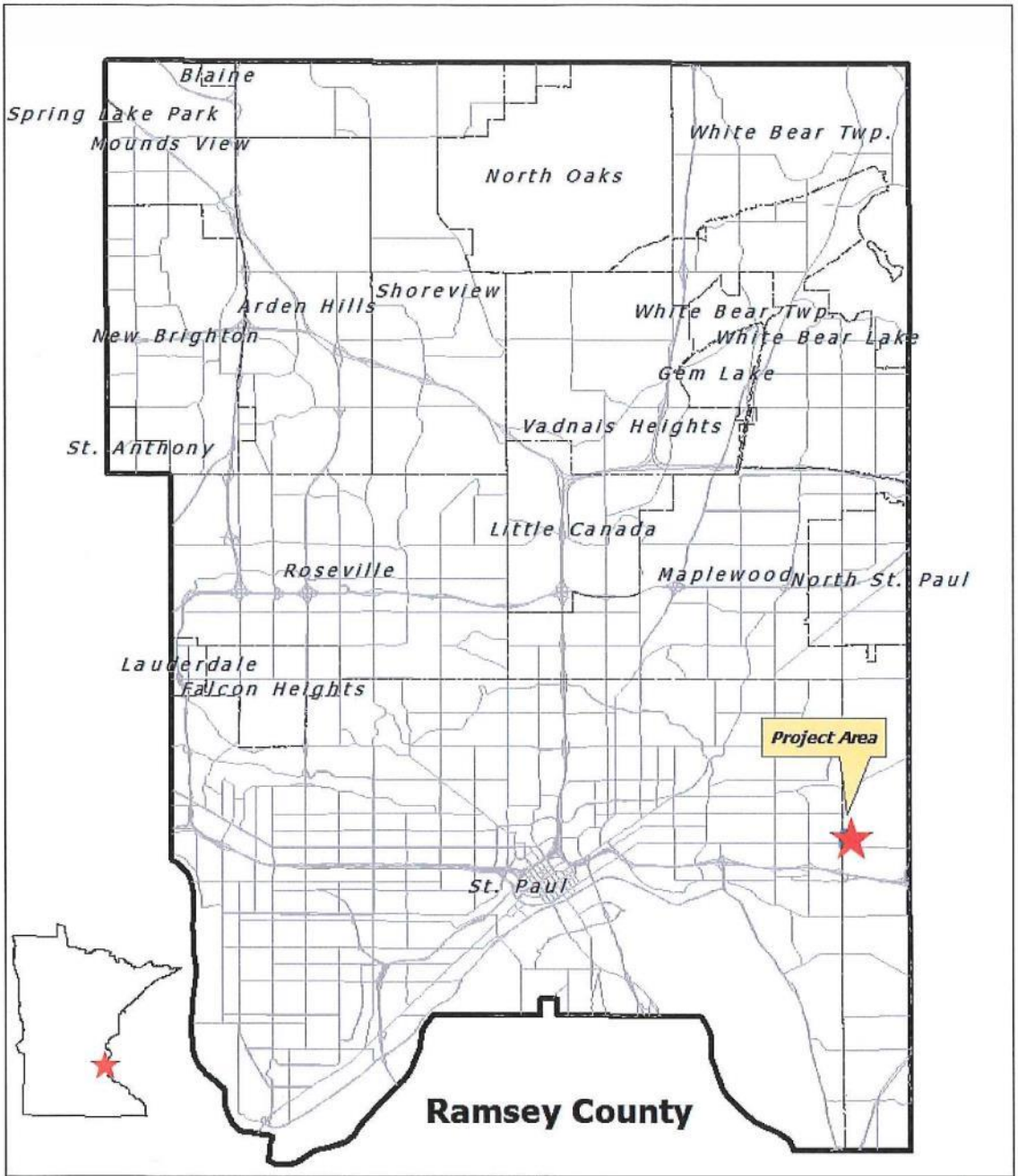

Figure 1. Project Location Map

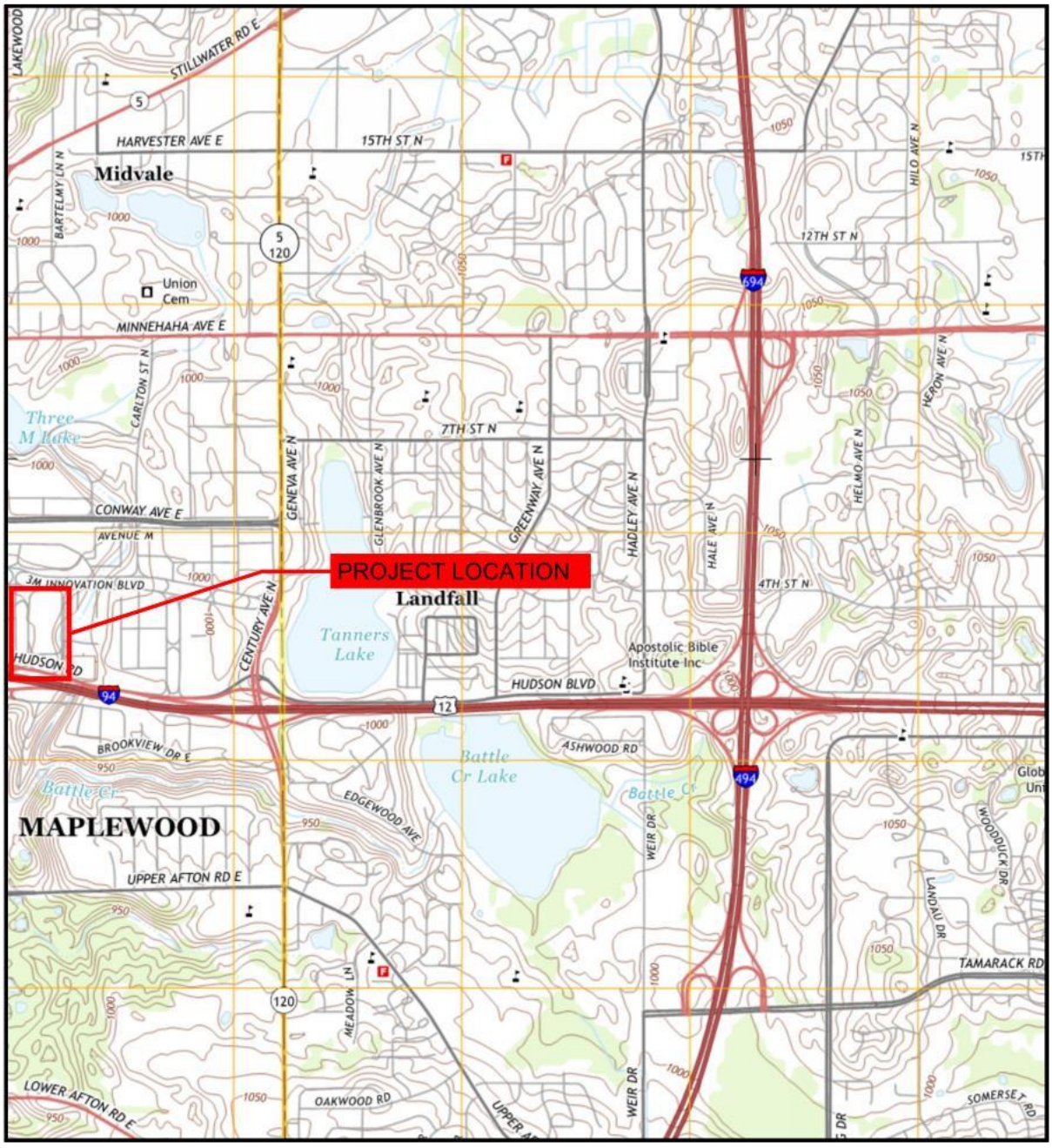

FIGURE 2
Project Boundary Map
USGS 7.5 Minute Topographic Map

FIGURE 3
Existing Site

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0 1000 2000

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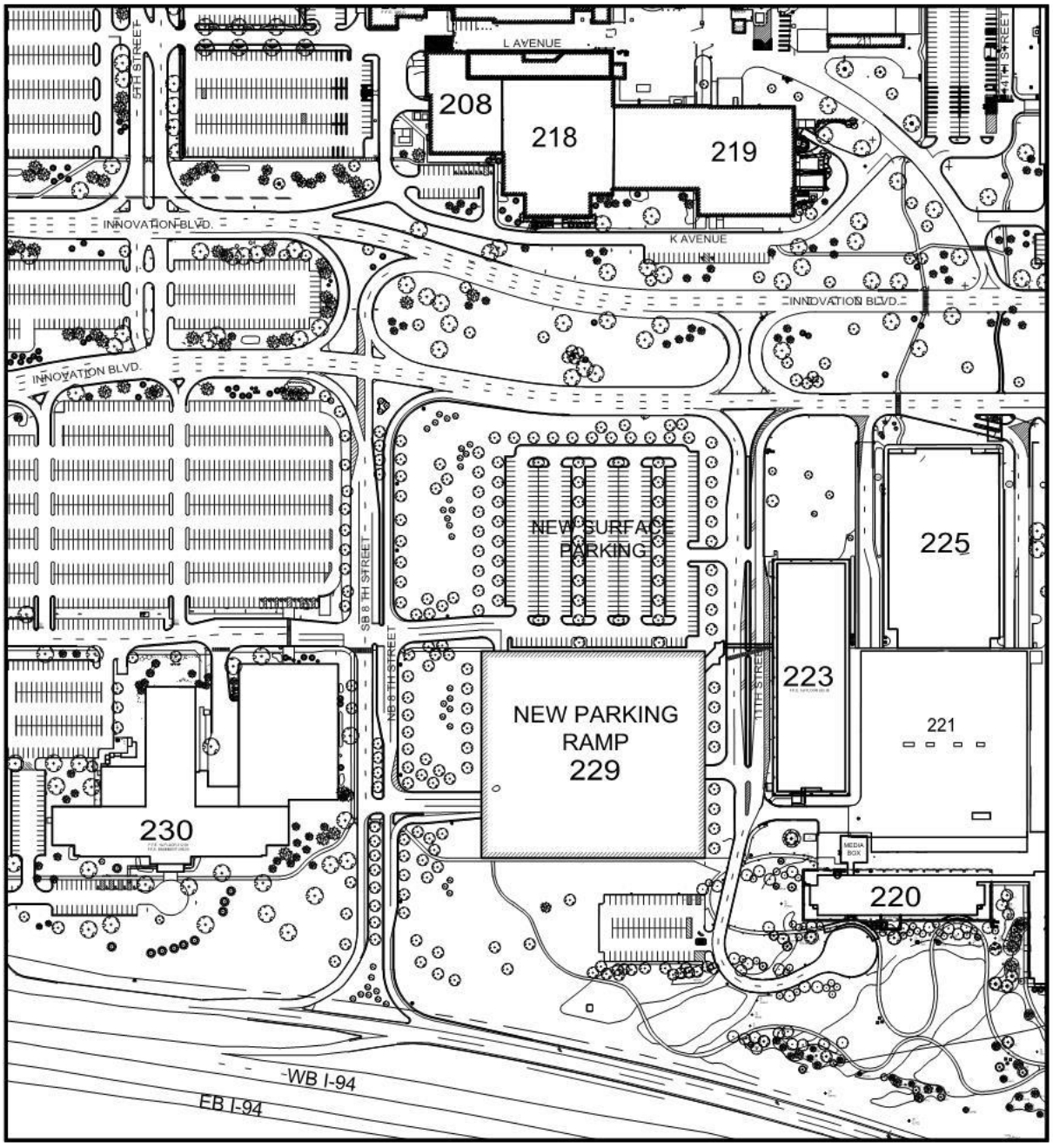

FIGURE 4
3M Parking Ramp Site Plan

d. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

Response: The project purpose is to replace an aging parking ramp with a new ramp. The existing ramp has experienced significant deterioration, and the cost to continue repairs would be high. The new ramp will replace the aging ramp and provide additional parking at the 3M Center Campus.

e. Are future stages of this development including development on any other property planned or likely to happen? ☐ Yes X No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

f. Is this project a subsequent stage of an earlier project? ☐ Yes X No
If yes, briefly describe the past development, timeline and any past environmental review.

7. **Cover types:** Estimate the acreage of the site with each of the following cover types before and after development:

Table 1. Cover Types

	Before	**After**		**Before**	**After**
Wetlands			Lawn/landscaping	5%	5%
Deep water/streams			Impervious surface	95%	95%
Wooded/forest			Storm water Pond		
Brush/Grassland			Other (describe)		
Cropland					
			TOTAL	**100%**	**100%**

8. **Permits and approvals required:** List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

Table 2. Permits and Approvals Required

Unit of Government	Type of Application	Status
State		
Minnesota Pollution Control Agency	National Pollutant Discharge Elimination System Construction Storm water Permit	To be applied for
	Section 401 Water Quality Certification	To be applied for (if needed)
Department of Labor and Industry	Plumbing Review	To be applied for
Local		
Ramsey-Washington Metro Watershed District	Watershed District Permit	To be applied for
City of Maplewood	Building Permits Community Design Review Approval Grading Permit	Approval to be requested To be applied for

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land use:

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

Response:

The site is located on the 3M Center Campus, north of Interstate 94 and between 8th Street and 11th Street. The City of Maplewood's 2030 Comprehensive Plan identifies the entire 3M Center Campus as an area of "Mixed Use Industrial" land uses on the existing and future land use maps included in the plan. The City's Zoning Map identifies the portion of the 3M Center Campus that includes the project site as a Heavy Manufacturing use. Land uses to the west and south of the 3M Center Campus, across McKnight Road North and Interstate 94, include existing single-family residential and commercial uses.

The project site is surrounded by other developed portions of the 3M Center Campus. The project is compatible with and similar to existing uses on the 3M Center Campus. McKnight Road and Interstate 94 separate the site and surrounding campus from the residential and commercial areas to the west and south. The surrounding uses and 3M Center Campus have co-existed in this location for decades. Traffic to and from the new parking ramp will utilize McKnight Road, Interstate 94, and the roadways within the 3M Center Campus, and will not travel through the single family neighborhoods. Storm water from the project site will be

managed within the campus using new and existing infrastructure and best management practices approved by the City of Maplewood and Ramsey-Washington Metro Watershed District. Treated storm water will discharge from the site to Battle Creek as it does under current site conditions. This analysis identified no new impacts to surrounding neighborhoods as a result of construction of the new parking ramp and surface parking lot.

There is an existing open space area around 3M Lake at the north side of the 3M Center Campus, but there are no other parks, trails, or farmlands near the project site that will be affected by the project.

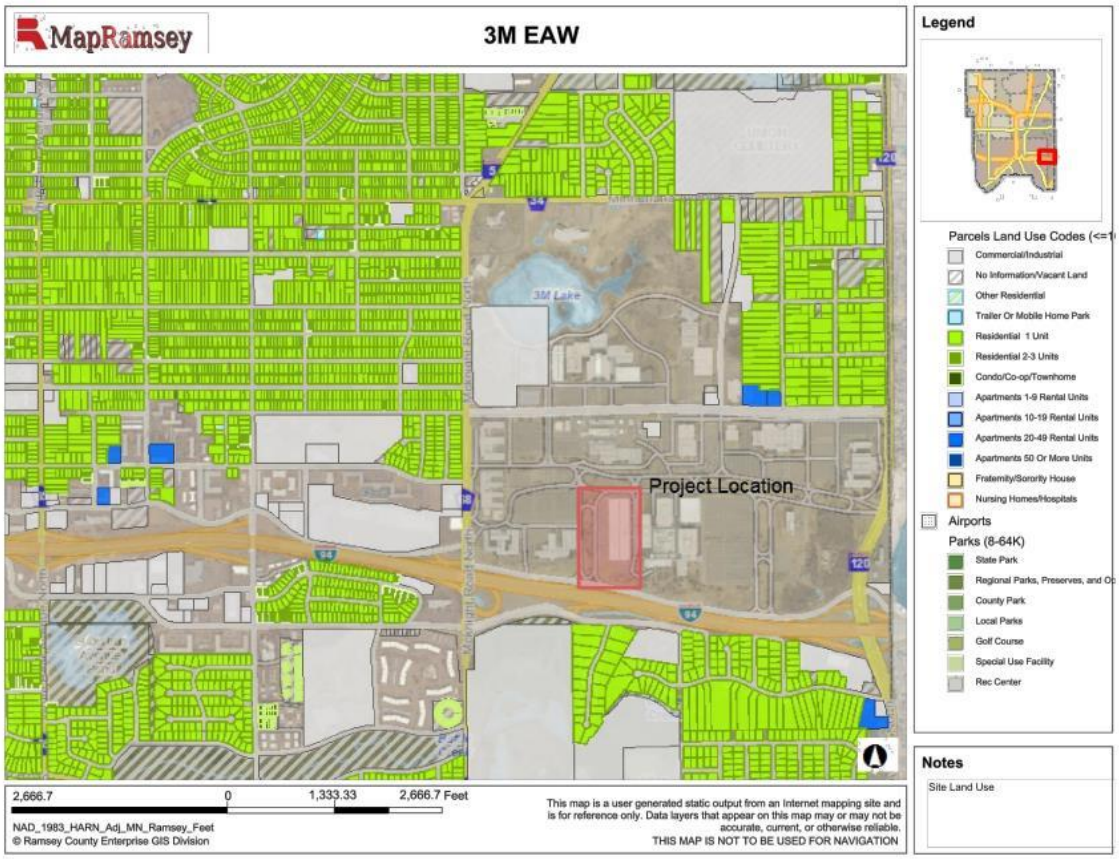

FIGURE 5
Land Use Exhibit

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

Response: The City of Maplewood 2030 Comprehensive Plan identifies the 3M Center Campus, including the project site, as an area of "Mixed Industrial" use. The site is within the Ramsey-Washington Metro Watershed District, and the District's current Watershed Management Plan indicates that the site is within the Battle Creek sub watershed. The project site is not within other regional, state or federal land use plans or districts.

iii. Zoning, including special districts or overlays such as shore land, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

Response: The project site is not within a shore land, floodplain, wild and scenic river, critical area, agriculture preserves, or other special zoning district or overlay district.

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

Response: The project site is surrounded by other developed portions of the 3M Center Campus. The project is similar to and compatible with the other uses on the 3M Center Campus, which includes other parking ramps and surface parking areas, office buildings, and laboratory and research facilities.

The project and use are consistent with the current zoning for the area (Heavy Manufacturing), and consistent with the existing and proposed land use plans in the City's 2030 Comprehensive Plan. The replacement of the existing ramp with a new ramp and surface parking lot will not change traffic levels and patterns in the area, and is compatible with the City's existing and proposed transportation system. The site is currently occupied by 100% impervious surface, and the land coverage will be the same after the development of the new ramp and parking lot. The project will obtain all necessary permits for potential environmental effects to be consistent with local plans and rules.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

Response: The project is consistent with adjacent land uses, zoning, and plans, and no mitigation is needed.

10. Geology, soils and topography/land forms:

a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

Response: The *Ramsey County Groundwater Protection Plan (2009)* indicates that the uppermost bedrock layer in the area of the site is Platteville Limestone that is more than 90 feet below the surface. Soil layers above the bedrock are composed of glacial outwash materials that have been modified at the surface by urban land uses. There are no known or mapped sinkholes or karst conditions on the site or in the immediate area. The geology of the site does not limit the project or require mitigation measures to accommodate the project.

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to storm water runoff should be addressed in response to Item 11.b.ii.

Response: The Ramsey County Soil Survey indicates that the soils on the site are classified as #858—Urban land-Chetek complex, and the NRSC soil classification is Chetek Series. These soils are located on glacial outwash plains and have been developed for urban uses. The Soil Survey indicated that the soils are well-suited to building and urban development. The upper soil has been compacted by previous land uses and is not highly-permeable. Underlying soils are moderately-permeable, and surface runoff may be slow to rapid on Chetek Series soils. The potential for soil contamination from wastes or chemicals is moderate.

The site slopes gently west to east, but has no steep slopes. Stabilization or soil correction will not be required to prepare this site for project construction. Construction will include demolishing and removing the existing structure, grading the site for the new structure, and excavation as needed for the new parking ramp.

Estimated acreage of soil disturbance: 8.5 acres.

NOTE: For silica sand projects, the EAW must include a hydrogeological investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

Response: N/A

11. Water resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

Response: The project area is not adjacent to any DNR protected public waters or wetlands. The project area is within approximately 1 mile of Battle Creek between Battle Creek Lake 82-91P and Pigs Eye Lake 62-4P. The location of the DNR protected water is shown on Figure 6.

The site runoff discharges through a 72-inch culvert under Interstate 94 to Battle Creek. Battle Creek is located within 1 mile of the project, and drains to Battle Creek Lake. Battle Creek Lake is listed on the current MPCA 303d Impaired Waters List, and is impaired for Aquatic Recreation and Aquatic Consumption.

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

Response:

Historic soil borings completed within the project area identified shallow ground water at 35-45 feet below the soil surface across the project area. There are no existing wells on the project site.

The project is not located within a Minnesota Department of Health wellhead protection area.

The Minnesota Well Index lists several 3M Company wells within ½ mile of the project, including:

- Well ID 767867 – located on 7th Street east of the project area and used by 3M for irrigation
- Well ID 207968 – located west of the project in 3M Building #201
- Well ID 207969 – located west of the project area in 3M Building #207

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

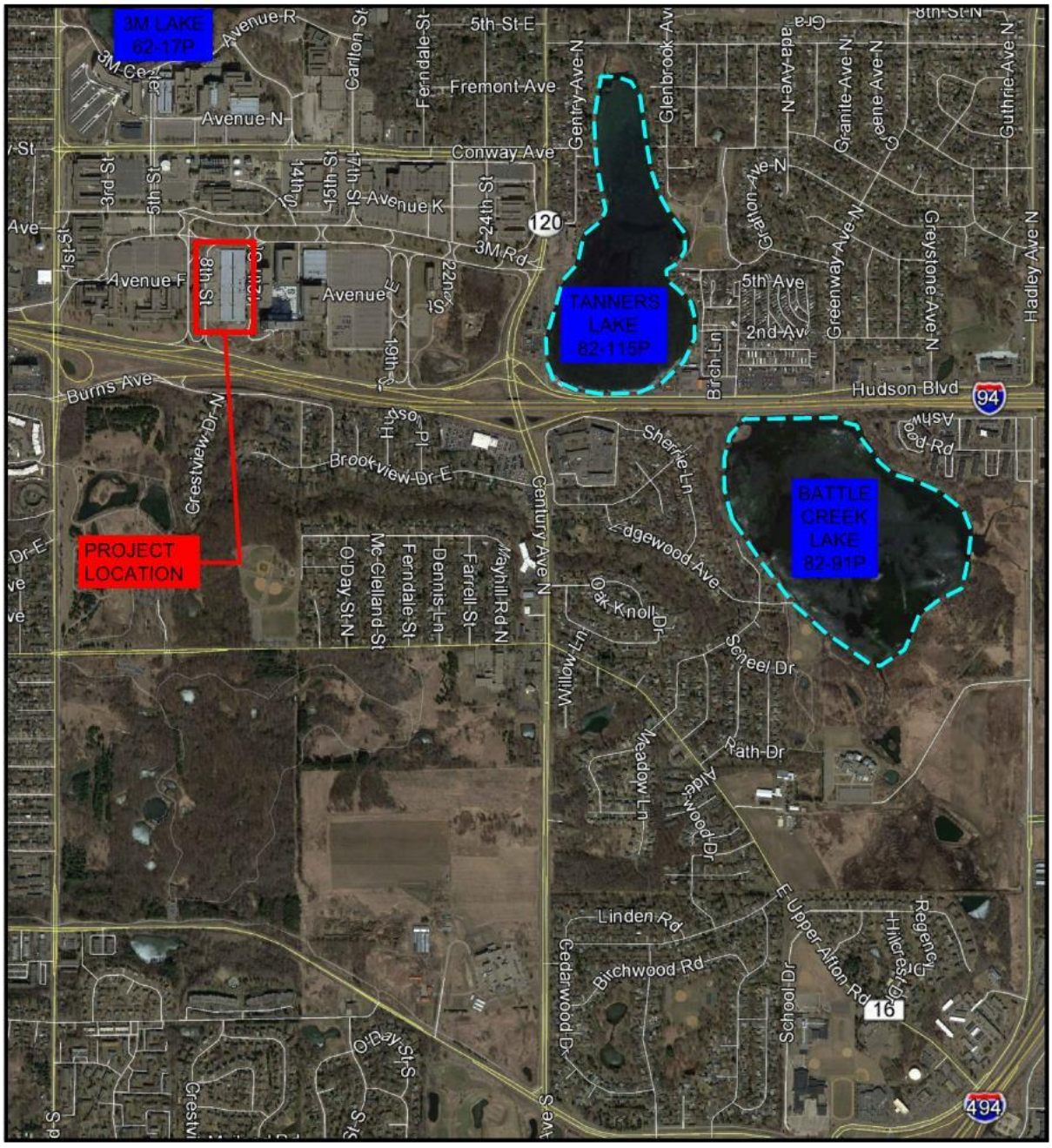

FIGURE 6
Public Waters Map

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0 1500 3000

SCALE = FEET

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.
3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

Response: Waste water treatment at the project site will consist of sanitary floor drains within the enclosed portions of the ramp for the capture of snow melt and vehicle runoff and mop sinks for janitorial purposes. The site discharges sanitary wastewater to the Metropolitan Council's Wastewater Treatment Plant via the Maplewood municipal sanitary sewer system. On site pretreatment will include a flammable waste trap. The increased demand will not require any modifications or expansion of the Maplewood municipal sewer system or the Metropolitan Waste water Treatment Facility.

ii. Storm water - Describe the quantity and quality of storm water runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from storm water discharges. Describe storm water pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat storm water runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

Response: Storm water runoff from the project area currently discharges to Battle Creek via storm sewer. The proposed project will maintain existing drainage patterns. The quantity of proposed impervious surface will be similar to the existing condition. The project will slightly reduce the amount of impervious surface within the project area, and will need to meet the current storm water volume reduction standards. The peak runoff rates are expected to be reduced from current levels, as shown on the table below.

The use of the space will be similar to the existing condition and, as such, the types of potential contaminants in storm water runoff are expected to be similar, namely, suspended solids and contaminants related to sediment transport. These contaminants will be treated by infiltrating a depth of 1.1 inches of stormwater volume (filtration receives 55% credit, filtration with iron-enhanced media receives 80% credit) over the impervious area. Maintaining the existing peak discharge rates will be managed through the filtration/infiltration basins, releasing the water at a controlled rate. The filtration/infiltration basins will be designed in accordance with the Ramsey Washington Metro Watershed District requirements. Peak flow rates will be controlled for the 2-, 10-, and 100-year storm events. A comparison of existing and proposed peak discharges is shown below (calculations based on Atlas 14).

Table 3. Existing and Proposed Peak Discharge to Battle Creek

Receiving Water	1.1-inch Event (CFS)		2-Year Event (CFS)		10-Year Event (CFS)		100-Year Event (CFS)	
	Ex.	Prop.	Ex.	Prop.	Ex.	Prop.	Ex.	Prop.
Battle Creek	10.5	2.0	40.2	7.8	68.4	25.0	136.9	70.5

A Storm Water Pollution Prevention Plan (SWPPP) will be developed in accordance with the requirements of the NPDES Construction Storm water Permit and the RWMWD permit. Specific erosion and sediment control measures consist of rock construction entrances to minimize tracking of sediments off site; culvert end controls and storm drain inlet protection; silt fence and sediment control logs installed down gradient of all construction areas prior to any soil disturbance; sediment control logs placed in ditches; and hydraulic soil stabilizers, mulch, and erosion control blankets applied over all temporary and permanently-seeded areas.

iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

Response: No dewatering or appropriate of ground or surface waters will be needed for this project.

iv. Surface Waters

a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

Response: Based on a survey of the national wetland inventory and existing land use, there are no identified wetlands that will be disturbed as part of the project.

b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

Response: There are no surface waters that will be physically altered or disturbed as part of the project.

12. Contamination/Hazardous Materials/Wastes:

a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

Response: An environmental records search of State and Federal databases was used to assess potential environmental hazards on or near the project site due to past land uses. The MPCA and federal databases identified no locations of hazardous materials, spills, or pipelines on the project site. The MPCA database identified a Leaking Aboveground Storage Tank (LAST) approximately ½ mile from the project site that was reported in 1948, which has been remediated.

The *Ramsey County Groundwater Protection Plan (2009)* indicates that the western edge of the 3M Perfluouochemicals (PFC) groundwater plume exists approximately ½ mile to the east of the project site. The plume extends to the north and east, and does not come within ½ mile of the project site.

The project will not involve disturbing soils or sites outside the 8-acre project site. Therefore, there are no potential environmental hazards or contaminated sites that will be disturbed or could be impacted by the proposed project.

b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

Response: Demolition of the existing parking ramp will generate solid waste, mainly consisting of concrete and reinforcing steel. The project contractor will recycle materials if possible, and dispose of materials that cannot be recycled in a licensed landfill.

c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

Response: No hazardous materials will be used or stored during construction or operation of the project.

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

Response: No hazardous wastes have been identified at the site. If hazardous materials are identified during construction activities (such as asbestos), the owner and contractor will handle and dispose of the materials to meet all local, state and federal requirements. No above- or below- ground storage tanks exist or are planned for the site.

13. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number and/or correspondence number (**ERDB 20160453**) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

Response: The DNR's Natural Heritage Review of the proposed project identified two rare animal species that have been identified in the vicinity of the project:

- Blanding's turtles (*Emydoidea blandingii)*, a state-listed threatened species
- Northern long-eared bat *(Myotis septentrionalis)*, a federally-listed threatened species and state-listed species of special concern

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Response: Neither of the rare species is likely to be impacted by the project, based on the species and habitat information provided by the DNR:

- Blanding's turtles require both wetland and upland habitats to complete their life cycle. There are no wetlands or other vegetated habitats on the project site. The closest wetland is more than ½ mile to the north, and is separated from the site by streets, buildings, and parking lots in developed areas of the 3M Center Campus.
- Northern long-eared bats hibernate in caves and mines, and utilize trees during their active season (April-October). Activities that may impact the bats include disturbance of habitat in caves and mines, and tree removal. There are no caves or mines on the project site. The new parking ramp will be developed on the site of the existing ramp, and no tree removal will be required for the project.

d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

Response: The DNR provided a list of recommendations for areas inhabited by Blanding's turtles. While there is no Blanding's turtle habitat within the project area, 3M will provide the DNR's flyer about Blanding's turtles to contractors working on the site so they are informed that the turtles have been identified in the project vicinity, and could remove them if any turtles are encountered on the site. The other DNR recommendations apply to projects that have wetlands on or near the site, or include roads as part of the project. The parking ramp project does not have wetlands on or near the site or include roadway development, so these recommendations are not applicable to this project.

The Natural Heritage review noted that the NHIS data does not contain any known occurrences of the northern long-eared bat roosts or hibernacula within a one-mile radius of the project. The project will not impact any caves or mines, and will not include tree removal. Therefore, it will not require mitigation or a takings permit for northern long-eared bats.

14. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

Response: The State Historic Preservation Office (SHPO) provided the results of their review of the cultural resources database for the project site and surrounding. A copy of the search results is included in the attachments. The search included SHPO's databases for historic, archaeological, and architectural resources.

The search identified five properties within 1 mile of the project site. None of the properties listed on the National Register, or Certified as Eligible for the National Register. None of the properties is located on the 3M Center Campus or near the project site. The properties include two properties on Minnehaha Avenue East, one property on Century Avenue, and Interstate 94, south of the project site.

15. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

Response: The new parking ramp will replace an existing ramp, and will have little impact on views near the project site. The City and other agencies have not identified scenic views or vistas within the 3M Center Campus. The project will not produce visual effects such as vapor plumes or glare from intense lights. The lighting for the parking lot and surface ramp will meet the requirements of City ordinances.

16. Air:

a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

Response: The project will not generate stationary source air emissions above those existing in the area of the project or change air quality from existing conditions.

b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

Response: Carbon monoxide emissions from vehicles can cause elevated ambient levels of carbon monoxide at roadway intersections. In some cases, near intersections where traffic volume is very high and congestion is severe, emissions can cause violations of Federal and/or State standards for ambient concentrations of levels of carbon monoxide.

The Twin Cities area has an EPA-approved screening method where traffic conditions at a potential carbon monoxide hot spot are compared to a set of the "worst" intersections (highest Annual Average Daily Traffic [AADT] and worst Level of Service [LOS]. If the project does not meet the AADT benchmark criteria and does not affect one of the top ten modeled intersections, then it can be concluded it will not cause any Carbon Monoxide (CO) violations, since the "worst" intersections did not.

Using this screening method, the intersections near the proposed 3M Center Campus must have a highest annual average daily traffic volume of greater than 79,400 and an LOS of D or worse to be considered a potential carbon monoxide "hot spot." None of the affected intersections have highest annual average traffic volumes exceeding the 79,400 threshold, and none of the intersections have an LOS of D or worse. Therefore, the traffic at these intersections will not cause a violation of the ambient carbon monoxide standards or require mitigation.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

Response: During construction, particulate emissions may temporarily increase due to the generation of fugitive dust. The following dust control measures will be implemented to control dust during construction:

- Minimize the period and extent of areas being exposed or graded.
- Spray construction areas and haul roads with water if needed, especially during periods of high wind or high levels of construction activity.
- Minimize the use of vehicles on unpaved surfaces.
- Cover or spray material stock piles and truck loads

The construction and operation of the parking facilities will not involve processes or materials that would generate odors.

17. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Response: Noise from construction activity will be temporary. The hours of construction will conform to the City's ordinance requirements

The operation of the new ramp to replace the existing ramp will not changes the existing noise levels and sources in the area. There are no sensitive receptors near the project, which is located within an area of industrial land uses. The project construction and operation will conform to state noise standards, and no mitigation is required.

18. Transportation

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

Response:

i. Existing and proposed additional parking spaces

The existing parking ramp has spaces to accommodate 1,556 vehicles. The proposed new parking ramp to replace the existing in the same location will include approximately 1,866 parking stalls. A proposed surface lot adjacent to and on the north side of the proposed parking ramp will include approximately 400 parking stalls. The project will create a total of approximately 710 new parking spaces.

ii. Estimated total average daily traffic generated

By itself, a parking ramp generates no traffic. Instead, the traffic for a parking ramp is generated by the land uses around it.

The 3M Center Campus has an existing parking issue today. Motorists destined for the quad area, Buildings 220, 223, 224, and 225 to the east of the proposed parking ramp, must currently park in other areas around the campus. The proposed parking ramp will not draw new trips to the surrounding area, but will alter internal traffic and allow more employees to park closer to the 3M Center Campus buildings where they work.

While overall traffic in the surrounding area is not expected to increase, the traffic on 8th Street will growth as travel patterns change and the additional parking stalls are used. To determine the expected additional vehicles to and from the proposed ramp, two calculations were completed; one examining typical employee driving habits and another using the existing peak hour trips per parking space.

As with most office settings, 3M employees generally arrive in the morning, may drive off-campus for lunch either solo or with a group, and then depart in the early evening. The first assumption to complete this calculation is that all the proposed parking spaces will be filled during a typical workday morning and subsequently emptied during a typical workday early evening. The second assumption is that half of these parked vehicles will complete an additional trip over lunch. Under these assumptions, the proposed parking ramp would generate 2,130 new vehicles trips per day on 8th Street.

For other projects on the 3M Center Campus, traffic counts were obtained for the existing parking ramp (a.m. and p.m. peak hours) and other roadways in the campus area (13-hour to full day counts). Using the ratio of existing parking spaces to proposed parking spaces, the anticipated peak hour volumes for the proposed parking ramp were established. Then a comparison of existing traffic counts showed that the peak hour volumes (both a.m. and p.m. peak hour together) represent between 25 and 40 percent of the daily volume, depending upon the exact area. To provide a conservatively high value, the ratio between peak hour and daily volume was assumed at 25 percent. By dividing the combined forecasted traffic for each peak hour by 25 percent this analysis found that the proposed parking ramp is expected to generate 2,224 new vehicle trips per day on 8th Street.

Based on calculating expected daily traffic volumes using two methodologies, the proposed ramp is expected to generate approximately 2,200 new vehicles trips per day on 8th Street. It is important to note that these trips are expected to come from other areas of the 3M Center Campus and are not new traffic to and from the surrounding area.

iii. Estimated maximum peak hour traffic generated and time of occurrence,

The increase in peak hour traffic was estimated using existing traffic counts to/from the existing parking ramp and a ratio of existing parking spaces to proposed parking spaces. Based upon this calculation, the maximum peak hour traffic generated by the additional spaces is 298 trips during the a.m. peak hour. It is important to note that these trips are expected to come from other areas of the 3M Center Campus and are not new traffic to and from the surrounding area.

iv. Indicate source of trip generation rates used in the estimates,

The calculations and assumptions used to establish the forecasted daily and peak hour traffic are based upon existing daily and turning movement counts. These counts were completed in years 2012, 2013, or 2015 for previous projects on the 3M Center Campus. The Minnesota Department of Transportation (MnDOT) provided additional daily volumes in the surrounding area to complement the counts.

v. Availability of transit and/or other alternative transportation modes.

The 3M Center Campus is served by Metro Transit routes 219 and 294. Bus stops for these routes are available on McKnight Road, Conway Avenue, and Century Avenue (Highway 120), all within one mile of the proposed parking ramp. The closest stops are located to the northwest of the proposed site at the intersection of Conway Avenue and 5th Street, about a 1,500-foot walk.

3M Center Campus also has several sidewalks and trails that provide access around and to/from various buildings, including two east-west routes that cross 8th Street.

A multi-modal transportation plan for the 3M Center Campus was recently completed that, when implemented, will improve vehicular, pedestrian, and bicycle transportation. The plan is designed to guide planning, development, and management of existing and future transportation facilities as well as connections to adjacent roads, trails, and sidewalks outside the campus. The proposed revision of 8th Street, associated with the proposed parking ramp, is working within the context of this master plan. Improvements incorporated in the design include reducing the number of vehicle lanes, revising intersections to the more traditional 90-degree geometry, and adding to the trail network.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance.

The proposed parking ramp is expected to increase traffic on 8th Street by approximately 2,200 vehicle trips per day, 298 vehicle trips per a.m. peak hour, and 258 vehicle trips per p.m. peak hour during a typical workday. It is important to note that these vehicle trips are not new trips to the surrounding area, but a revision of travel patterns within the 3M Center Campus to make use of the new spaces. Therefore, the proposed parking ramp is not expected to have any impact on the regional transportation system.

Due to the new traffic on 8th Street and the proposed changes to the road itself, the traffic operations on 8th Street were examined. Forecasts were developed using the existing counts on 8th Street, completed for an earlier 3M Center Campus project, and the trip generation discussed. In addition, due to the availability of direct left turns as oppose to the current U-turn geometry, a slight increase in traffic to/from the surface parking lot on the west side of 8th Street was assumed. As with the proposed parking ramp, this traffic is assumed to be a revision of travel from other areas of the campus, not new traffic in the surrounding area.

The existing traffic volumes and forecasted new traffic on 8th Street were revised for the new geometry, with some adjustments assumed due to more direct access to the existing and proposed parking areas. This resulted in a more balanced distribution of traffic to/from the proposed parking ramp between Innovation Road to the north and Hudson Road to the south.

Source: City of San Jose, CA

With forecasts established for the proposed 8th Street and parking ramp, an intersection capacity analysis was conducted for the existing intersections per the *Highway Capacity Manual, 2010*. Intersections are assigned a "Level of Service" letter grade for the peak hour of traffic based on the number of lanes at the intersection, traffic volumes, and traffic control. Level of Service A (LOS A) represents light traffic flow (free flow conditions) while LOS F represents heavy traffic flow (over capacity conditions). LOS D is considered acceptable at intersections. Individual movements are also assigned LOS grades. At busy intersections, one or more individual movements may operate at a lower LOS when the overall intersection is operating acceptably. This situation often occurs for movements with relatively low volumes and a relatively high overall traffic signal cycle length or at side street stop controlled intersections with a high volume of through vehicles on the main line. The pictures on the left represent some of the LOS grades (from a signal controlled intersection in San Jose, CA). These LOS grades represent the overall intersection operation, not individual movements.

The LOS results for the a.m. and p.m. peak hours using the projected volumes are summarized in Table 18-1 below. The LOS calculations were completed with the Synchro/SimTraffic software package, which uses the methodology detailed in the *Highway Capacity Manual 2010*. The full LOS calculations are provided in the Appendix.

Table 4. Projected Peak Hour Level of Service (LOS)[1] on 8th Street

Intersection	Traffic Control	AM Peak Hour	PM Peak Hour
8th Street at Eastbound Innovation Road	Stop Sign Control on the side street (8th Street free-flowing)	A (a)	A (a)
8th Street at North Parking Ramp Access		A (c)	A (c)
8th Street at South Parking Ramp Access		A (f)	A (a)
8th Street at Westbound Hudson Road		A (a)	A (a)

[1] The first letter is the Level of Service for the intersection. The second letter (in parentheses) is the Level of Service for the worst operating movement.

As shown, the overall level of service is acceptable at each intersection during both peak hours studied. Individual movements are also acceptable at each intersection, with the exception of the westbound left turn from the south Parking Ramp access at 8th Street. However, this less-than-desired result impacts few vehicles (projected at 10 vehicles during the a.m. peak hour) and the 95th percentile stacking (vehicle queues that are exceeded only five percent of time) in this left turn lane was only two vehicles. Due to the low number of vehicles and minimal queue, this result is not a concern.

Queue lengths for other movements are also reasonable for this type of control. The planned length of the turn lanes on 8th Street is sufficient to accommodate the expected vehicle stacking.

Based on these results, the proposed 8th Street geometry is able to safely and efficiently accommodate the expected increase in traffic volumes on 8th Street associated with the proposed parking ramp.

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

Response: A multi-modal transportation plan for the 3M Center Campus that was completed in 2015 has identified improvements that, when implemented, will improve vehicular, pedestrian, and bicycle transportation. The plan is designed to guide planning, development, and management of existing and future transportation facilities as well as connections to adjacent roads, trails, and sidewalks outside the campus. The proposed revision of 8th Street, associated with the proposed parking ramp, is working within the context of this master plan. Improvements incorporated in the design include reducing the number of vehicle lanes, revising intersections to the more traditional 90-degree geometry, and adding to the trail network. As more elements of this plan are implemented, the safety and accessibility of bicycling and walking to/from and around campus will increase.

In addition to this multi-modal transportation plan, 3M encourages and helps facilitate groups that work to reduce single-occupancy vehicle travel. For instance, the bicycle group provides communication between those who wish to bicycle to/from campus as well as advocacy for improvements to the campus and external connections that will improve those facilities. In addition, this group hosts a monthly ‘ride-to-work’ day that encourages other employees to ride to/from work in organized large groups.

Other mitigation measures implemented by 3M include promotion of transit opportunities, campus shuttle to reduce driving between buildings, and allowing flextime among employees.

By continuing to encourage these groups as well as continuing to promote education of alternative modes of transportation, 3M will help minimize the impacts of single-occupancy vehicles on the roadway system.

19. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project-related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

Response: The project will be constructed within a 8-acre site on the 3M Center Campus. Construction will be completed within 15 months. All potential project impacts (storm water impacts, construction noise and dust) will be addressed through permitting and compliance with City ordinances. There are no project-related environmental effects that could combine with other effects to result in cumulative potential impacts.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

Response: 3M has identified no future projects near the project site or within the time frame when the project will be constructed that will interact with the potential environmental effects of the project.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

Response: The project does not have the potential for significant environmental effects due to cumulative effects. All potential project impacts will be mitigated through compliance with permit requirements and City ordinances. There are no known past or future projects near the project area that will result in cumulative effects with the proposed project.

20. Other potential environmental effects: If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

Response: Not applicable.

RGU CERTIFICATION *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature _____ Date _____

Title _____

Attachments:

- DNR NHIS Data
- SHPO Data
- 8th Street Evaluations-AM Peak Hours
- 8th Street Evaluations-PM Peak Hours

Minnesota Department of Natural Resources
Division of Ecological and Water Resources, Box 25
500 Lafayette Road
St. Paul, Minnesota 55155-4025

Phone: (651) 259-5091 E-mail: samantha.bump@state.mn.us

June 23, 2016 **Correspondence # ERDB 20160453**

Ms. Sherri Buss
TKDA, Inc.
444 Cedar Street, Suite
1500 St. Paul, MN 55101

RE: Natural Heritage Review of the proposed 3M B229 Parking Ramp
EAW; T29N R22W Section 36; Ramsey County

Dear Ms. Buss,

As requested, the Minnesota Natural Heritage Information System (NHIS) has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. Based on this query, the following **rare species *may* be adversely affected** by the proposed project:

- Blanding's turtles (*Emydoidea blandingii)*, a state-listed threatened species, have been reported in the vicinity of the proposed project and may be encountered on site. For your information, I have attached a Blanding's turtle fact sheet that describes the habitat use and life history of this species. The fact sheet also provides two lists of recommendations for avoiding and minimizing impacts to this rare turtle. **Please refer to the first list of recommendations for your project.** In addition, if erosion control mesh will be used, the DNR recommends that the mesh be limited to wildlife- friendly materials (see enclosed fact sheet). If greater protection for turtles is desired, the second list of additional recommendations can also be implemented.

  The attached flyer should be given to all contractors working in the area. If Blanding's turtles are found on the site, please remember that state law and rules prohibit the destruction of threatened or endangered species, except under certain prescribed conditions. If turtles are in imminent danger they should be moved by hand out of harm's way, otherwise they should be left undisturbed.

- The northern long-eared bat (*Myotis septentrionalis*), federally listed as threatened and state- listed as special concern, can be found throughout Minnesota. During the winter this species hibernates in caves and mines, and during the active season (approximately April-October) it roosts underneath bark, in cavities, or in crevices of both live and dead trees. Pup rearing is during June and July. Activities that may impact this species include, but are not limited to, wind farm operation, any disturbance to hibernacula, and destruction/degradation of habitat (including tree removal).
  The U.S. Fish and Wildlife Service (USFWS) has published a final 4(d) rule that identifies prohibited take. To determine whether you need to contact the USFWS, please refer to the

USFWS Key to the Northern Long-Eared Bat 4(d) Rule (see links below). Please note that the NHIS does not contain any known occurrences of northern long-eared bat roosts or hibernacula within an approximate one-mile radius of the proposed project.

- The Environmental Assessment Worksheet should address whether the proposed project has the potential to adversely affect the above rare features and, if so, it should identify specific measures that will be taken to avoid or minimize disturbance. Sufficient information should be provided so the DNR can determine whether a takings permit will be needed for any of the above protected species.

- Please include a copy of this letter in any state or local license or permit application. **Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.**

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. **If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.**

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location (noted above) and the project description provided on the NHIS Data Request Form. Please contact me if project details change or for an updated review if construction has not occurred within one year.

The Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. To determine whether there are other natural resource concerns associated with the proposed project, please contact your DNR Regional Environmental Assessment Ecologist (contact information available at http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html). Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. An invoice will be mailed to you under separate cover.

Sincerely,

Samantha Bump

Samantha Bump
Natural Heritage Review Specialist

enc. Blanding's Turtle Fact Sheet and Flyer Wildlife Friendly Erosion Control

Cc: Becky Horton, Leslie Parris

Links: USFWS Key to the Northern Long-Eared Bat 4(d) Rule for Non-Federal Activities
http://www.fws.gov/midwest/endangered/mammals/nleb/KeyFinal4dNLEB.html USFWS Key to the Northern Long-Eared Bat 4(d) Rule for Federal Actions
http://www.fws.gov/midwest/endangered/mammals/nleb/KeyFinal4dNLEBFedProjects.html
USFWS Northern Long-eared Bat Website
http://www.fws.gov/midwest/endangered/mammals/nleb/index.html
USFWS Northern Long-eared Bat Fact Sheet
http://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html

Endangered, Threatened, and Special Concern Species of Minnesota

Blanding's Turtle
(*Emydoidea blandingii*)

Minnesota Status: Threatened
Federal Status: none
State Rank[1]: S2
Global Rank[1]: G4

HABITAT USE

Blanding's turtles need both wetland and upland habitats to complete their life cycle. The types of wetlands used include ponds, marshes, shrub swamps, bogs, and ditches and streams with slow-moving water. In Minnesota, Blanding's turtles are primarily marsh and pond inhabitants. Calm, shallow water bodies (Type 1-3 wetlands) with mud bottoms and abundant aquatic vegetation (e.g., cattails, water lilies) are preferred, and extensive marshes bordering rivers provide excellent habitat. Small temporary wetlands (those that dry up in the late summer or fall) are frequently used in spring and summer -- these fishless pools are amphibian and invertebrate breeding habitat, which provides an important food source for Blanding's turtles. Also, the warmer water of these shallower areas probably aids in the development of eggs within the female turtle. Nesting occurs in open (grassy or brushy) sandy uplands, often some distance from water bodies. Frequently, nesting occurs in traditional nesting grounds on undeveloped land. Blanding's turtles have also been known to nest successfully on residential property (especially in low density housing situations), and to utilize disturbed areas such as farm fields, gardens, under power lines, and road shoulders (especially of dirt roads). Although Blanding's turtles may travel through woodlots during their seasonal movements, shady areas (including forests and lawns with shade trees) are not used for nesting. Wetlands with deeper water are needed in times of drought, and during the winter. Blanding's turtles overwinter in the muddy bottoms of deeper marshes and ponds, or other water bodies where they are protected from freezing.

LIFE HISTORY

Individuals emerge from overwintering and begin basking in late March or early April on warm, sunny days. The increase in body temperature which occurs during basking is necessary for egg development within the female turtle. Nesting in Minnesota typically occurs during June, and females are most active in late afternoon and at dusk. Nesting can occur as much as a mile from wetlands. The nest is dug by the female in an open sandy area and 6-15 eggs are laid. The female turtle returns to the marsh within 24 hours of laying eggs. After a development period of approximately two months, hatchlings leave the nest from mid-August through early- October. Nesting females and hatchlings are often at risk of being killed while crossing roads between wetlands and nesting areas. In addition to movements associated with nesting, all ages and both sexes move between wetlands from April through November. These movements peak in June and July and again in September and October as turtles move to and from overwintering sites. In late autumn (typically November), Blanding's turtles bury themselves in the substrate (the mud at the bottom) of deeper wetlands to overwinter.

IMPACTS / THREATS / CAUSES OF DECLINE

- loss of wetland habitat through drainage or flooding (converting wetlands into ponds or lakes)
- loss of upland habitat through development or conversion to agriculture
- human disturbance, including collection for the pet trade* and road kills during seasonal movements
- increase in predator populations (skunks, raccoons, etc.) which prey on nests and young

*It is illegal to possess this threatened species.

RECOMMENDATIONS FOR AVOIDING AND MINIMIZING IMPACTS

These recommendations apply to typical construction projects and general land use within Blanding's turtle habitat, and are provided to help local governments, developers, contractors, and homeowners minimize or avoid detrimental impacts to Blanding's turtle populations. **List 1** describes minimum measures which we recommend to prevent harm to Blanding's turtles during construction or other work within Blanding's turtle habitat. **List 2** contains recommendations which offer even greater protection for Blanding's turtles populations; this list should be used *in addition to the first list* in areas which are known to be of state-wide importance to Blanding's turtles (contact the DNR's Natural Heritage and Nongame Research Program if you wish to determine if your project or home is in one of these areas), or in any other area where greater protection for Blanding's turtles is desired.

List 1. Recommendations for all areas inhabited by Blanding's turtles.	**List 2. *Additional* recommendations for areas known to be of state-wide importance to**
GENERAL	
A flyer with an illustration of a Blanding's turtle should be given to all contractors working in the area. Homeowners should also be informed of the presence of Blanding's turtles in the area.	Turtle crossing signs can be installed adjacent to road- crossing areas used by Blanding's turtles to increase public awareness and reduce road kills.
Turtles which are in imminent danger should be moved, by hand, out of harms way. Turtles which are not in imminent danger should be left undisturbed.	Workers in the area should be aware that Blanding's turtles nest in June, generally after 4pm, and should be advised to minimize disturbance if turtles are seen.
If a Blanding's turtle nests in your yard, do not disturb the nest.	If you would like to provide more protection for a Blanding's turtle nest on your property, see "Protecting Blanding's Turtle Nests" on page 3 of this fact sheet.
Silt fencing should be set up to keep turtles out of construction areas. It is critical that silt fencing be removed after the area has been revegetated.	Construction in potential nesting areas should be limited to the period between September 15 and June 1 (this is the time when activity of adults and hatchlings in upland areas is at a minimum).
WETLANDS	
Small, vegetated temporary wetlands (Types 2 & 3) should not be dredged, deepened, filled, or converted to storm water retention basins (these wetlands provide important habitat during spring and summer).	Shallow portions of wetlands should not be disturbed during prime basking time (mid-morning to mid- afternoon in May and June). A wide buffer should be left along the shore to minimize human activity near wetlands (basking Blanding's turtles are more easily disturbed than other turtle species).
Wetlands should be protected from pollution; use of fertilizers and pesticides should be avoided, and run-off from lawns and streets should be controlled. Erosion should be prevented to keep sediment from reaching wetlands and lakes.	Wetlands should be protected from road, lawn, and other chemical run-off by a vegetated buffer strip at least 50' wide. This area should be left unmowed and in a natural condition.
ROADS	
Roads should be kept to minimum standards on widths and lanes (this reduces road kills by slowing traffic and reducing the distance turtles need to cross).	Tunnels should be considered in areas with concentrations of turtle crossings (more than 10 turtles per year per 100 meters of road), and in areas of lower density if the level of road use would make a safe crossing impossible for turtles. Contact your DNR Regional Nongame Specialist for further information on wildlife tunnels.

Roads should be ditched, not curbed or below grade. If curbs must be used, 4 inch high curbs at a 3:1 slope are preferred (Blanding's turtles have great difficulty climbing traditional curbs; curbs and below grade roads trap turtles on the road and can cause road kills).	Roads should be ditched, not curbed or below grade.
ROADS cont.	
Culverts between wetland areas, or between wetland areas and nesting areas, should be 36 inches or greater in diameter, and elliptical or flat-bottomed.	Road placement should avoid separating wetlands from adjacent upland nesting sites, or these roads should be fenced to prevent turtles from attempting to cross them (contact your DNR Nongame Specialist for details).
Wetland crossings should be bridged, or include raised roadways with culverts which are 36 in or greater in diameter and flat-bottomed or elliptical (raised roadways discourage turtles from leaving the wetland to bask on roads).	Road placement should avoid bisecting wetlands, or these roads should be fenced to prevent turtles from attempting to cross them (contact your DNR Nongame Specialist for details). This is especially important for roads with more than 2 lanes.
Culverts under roads crossing streams should be oversized (at least twice as wide as the normal width of open water) and flat-bottomed or elliptical.	Roads crossing streams should be bridged.
UTILITIES	
Utility access and maintenance roads should be kept to a minimum (this reduces road-kill potential).	
Because trenches can trap turtles, trenches should be checked for turtles prior to being backfilled and the sites should be returned to original grade.	
LANDSCAPING AND VEGETATION MANAGEMENT	
Terrain should be left with as much natural contour as possible.	As much natural landscape as possible should be preserved (installation of sod or wood chips, paving, and planting of trees within nesting habitat can make that habitat unusable to nesting Blanding's turtles).
Graded areas should be revegetated with native grasses and forbs (some non-natives form dense patches through which it is difficult for turtles to travel).	Open space should include some areas at higher elevations for nesting. These areas should be retained in native vegetation, and should be connected to wetlands by a wide corridor of native vegetation.
Vegetation management in infrequently mowed areas -- such as in ditches, along utility access roads, and under power lines -- should be done mechanically (chemicals should not be used). Work should occur fall through spring (after October 1st and before June 1st).	Ditches and utility access roads should not be mowed or managed through use of chemicals. If vegetation management is required, it should be done mechanically, as infrequently as possible, and fall through spring (mowing can kill turtles present during mowing, and makes it easier for predators to locate turtles crossing roads).

Protecting Blanding's Turtle Nests: Most predation on turtle nests occurs within 48 hours after the eggs are laid. After this time, the scent is gone from the nest and it is more difficult for predators to locate the nest. Nests more than a week old probably do not need additional protection, unless they are in a particularly vulnerable spot, such as a yard where pets may disturb the nest. Turtle nests can be protected from predators and other disturbance by covering them with a piece of wire fencing (such as chicken wire), secured to the ground with stakes or rocks. The piece of fencing should

measure at least 2 ft. x 2 ft., and should be of medium sized mesh (openings should be about 2 in. x 2 in.). It is **very important** that the fencing be **removed before August 1st** so the young turtles can escape from the nest when they hatch!

REFERENCES

[1]Association for Biodiversity Information. "Heritage Status: Global, National, and Subnational Conservation Status Ranks." NatureServe. Version 1.3 (9 April 2001). http://www.natureserve.org/ranking.htm (15April 2001).

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Sajwaj, T. D., and J. W. Lang. 2000. Thermal ecology of Blanding's turtle in central Minnesota. Chelonian Conservation and Biology 3(4):626-636.

Compiled by the Minnesota Department of Natural Resources Division of Ecological Resources, Updated March 2008 Endangered Species Environmental Review Coordinator, 500 Lafayette Rd., Box 25, St. Paul, MN 55155 / 651-259-5109

CAUTION

BLANDING'S TURTLES
MAY BE ENCOUNTERED IN THIS AREA

The unique and rare Blanding's turtle has been found in this area. Blanding's turtles are state-listed as Threatened and are protected under Minnesota Statute 84.095, Protection of Threatened and Endangered Species. Please be careful of turtles on roads and in construction sites. For additional information on turtles, or to report a Blanding's turtle sighting, contact the DNR Nongame Specialist nearest you: Bemidji (218-308-2641); Grand Rapids (218-327-4518); New Ulm (507-359-6033); Rochester (507-206-2820); or St. Paul (651-259-5772).

DESCRIPTION: The Blanding's turtle is a medium to large turtle (5 to 10 inches) with a black or dark blue, dome-shaped shell with muted yellow spots and bars. The bottom of the shell is hinged across the front third, enabling the turtle to pull the front edge of the lower shell firmly against the top shell to provide additional protection when threatened. The head, legs, and tail are dark brown or blue-gray with small dots of light brown or yellow. A distinctive field mark is the bright yellow chin and neck.

BLANDING'S TURTLES DO NOT MAKE GOOD PETS
IT IS ILLEGAL TO KEEP THIS THREATENED SPECIES IN CAPTIVITY

SUMMARY OF RECOMMENDATIONS FOR AVOIDING AND MINIMIZING IMPACTS

TO BLANDING'S TURTLE POPULATIONS

(see Blanding's Turtle Fact Sheet for full recommendations)

- This flyer should be given to all contractors working in the area. Homeowners should also be informed of the presence of Blanding's turtles in the area.
- Turtles that are in imminent danger should be moved, by hand, out of harm's way. Turtles that are not in imminent danger should be left undisturbed to continue their travel among wetlands and/or nest sites.
- If a Blanding's turtle nests in your yard, do not disturb the nest and do not allow pets near the nest.
- Silt fencing should be set up to keep turtles out of construction areas. It is critical that silt fencing be removed after the area has been revegetated.
- Small, vegetated temporary wetlands should not be dredged, deepened, or filled.
- All wetlands should be protected from pollution; use of fertilizers and pesticides should be avoided, and run-off from lawns and streets should be controlled. Erosion should be prevented to keep sediment from reaching wetlands and lakes.
- Roads should be kept to minimum standards on widths and lanes.
- Roads should be ditched, not curbed or below grade. If curbs must be used, 4" high curbs at a 3:1 slope are preferred.
- Culverts under roads crossing wetland areas, between wetland areas, or between wetland and nesting areas should be at least 36 in. diameter and flat-bottomed or elliptical.
- Culverts under roads crossing streams should be oversized (at least twice as wide as the normal width of open water) and flat-bottomed or elliptical.
- Utility access and maintenance roads should be kept to a minimum.
- Because trenches can trap turtles, trenches should be checked for turtles prior to being backfilled and the sites should be returned to original grade.
- Terrain should be left with as much natural contour as possible.
- Graded areas should be revegetated with native grasses and forbs.
- Vegetation management in infrequently mowed areas -- such as in ditches, along utility access roads, and under power lines -- should be done mechanically (chemicals should not be used). Work should occur fall through spring (after October 1st and before June 1st).

Compiled by the Minnesota Department of Natural Resources Division of Ecological and Water Resources, Updated August 2012 Endangered Species Review Coordinator, 500 Lafayette Rd., Box 25, St. Paul, MN 55155 / 651-259-5109

Wildlife Friendly Erosion Control

Wildlife entanglement in, and death from, plastic netting and other man-made plastic materials has been documented in birds (Johnson, 1990; Fuller-Perrine and Tobin, 1993), fish (Johnson, 1990), mammals (Derraik, 2002), and reptiles (Barton and Kinkead, 2005; Kapfer and Paloski, 2011). Yet the use of these materials continues in many cases, without consideration for wildlife impacts. Plastic netting is frequently used for erosion control during construction and landscape projects and can negatively impact terrestrial and aquatic wildlife populations as well as snag in maintenance machinery resulting in costly repairs and delays. However, wildlife friendly erosion control materials do exist, and are sold by several large erosion control material companies. Below are a few key considerations before starting a project.

Know Your Options

- Remember to consult with local natural resource authorities (DNR, USFWS, etc.) before starting a project. They can help you identify sensitive areas and rare species.
- When erosion control is necessary, select products with biodegradable netting (natural fiber, biodegradable polyesters, etc.).
- DO NOT use products that require UV-light to biodegrade (also called, "photodegradable"). These do not biodegrade properly when shaded by vegetation.
- Use netting with rectangular shaped mesh (not square mesh).
- Use netting with flexible (non-welded) mesh.

Woven 100% natural fiber erosion control materials being utilized along a central Minnesota stream. ©MN DNR, Nick Proulx

Fish trapped and killed by welded-plastic square erosion control mesh improperly placed along a small central Minnesota stream. Photo courtesy of Ben Lowe.

Know the Landscape

- It is especially important to use wildlife friendly erosion control around:
  - Areas with threatened or endangered species.
  - Wetlands, rivers, lakes, and other watercourses.
  - Habitat transition zones (prairie – woodland edges, rocky outcrop – woodland edges, steep rocky slopes, etc.).
  - Areas with threatened or endangered species.
- Use erosion mesh wisely, not all areas with disturbed ground necessitate its use. Do not use plastic mesh unless it is specifically required. Other erosion control options exist (open weave textile (OWT), rolled erosion control products (RECPs) with woven natural fiber netting).

WFEC Fact-sheet – MN DNR 2013 (acc.)

Protect Wildlife

- Avoid photodegradable erosion control materials where possible.
- Use only biodegradable materials (typically made from natural fibers), preferably those that will biodegrade under a variety of conditions.
- Wildlife friendly erosion control material costs are often similar to conventional plastic netting.

Plains Gartersnake trapped and killed by welded-plastic square erosion control mesh placed along a newly installed cement culvert in southern Minnesota. ©MN DNR, Carol Hall

A small vole that was strangled and killed by plastic erosion control material with welded and square mesh. Photo taken in southern Minnesota and provided courtesy of Tom Jessen.

Literature Referenced

Barton, C. and K. Kinkead. 2005. Do erosion control and snakes mesh? Soil and Water Conservation Society 60:33A-35A.

Derraik, J.G.B. 2002. The pollution of the marine environment by plastic debris: a aeview. Marine Pollution Bulletin 44:842-852.

Fuller-Perrine, L.D., and M.E. Tobin. 1993. A method for applying and removing bird-exclusion netting in commercial vineyards. Wildlife Society Bulletin 21:47-51.

Johnson, S.W. 1990. Distribution, abundance, and source of entanglement debris and other plastics on Alaskan beaches, 1982-1988. Proceedings of the Second International Conference on Marine Debris 331-348.

Kapfer, J. M., and R. A. Paloski. 2011. On the threat to snakes of mesh deployed for erosion control and wildlife exclusion. Herpetological Conservation and Biology 6:1-9.

Minnesota DEPARTMENT OF NATURAL RESOURCES

NONGAME WILDLIFE PROGRAM • MINNESOTA DEPARTMENT OF NATURAL RESOURCES •

WFEC Fact-sheet – MN DNR 2013 (acc.)

PROPERTY NAME Inventory Number	ADDRESS	Twp	Range	Sec	Quarters	USGS	Report	NRHP	CEF	DOE
COUNTY: Ramsey										
CITY/TOWNSHIP: Maplewood										
Minnehaha Drive-In Theater MWC-0032	2260 Minnehaha Ave. E	29	22	36	NWNW	Saint Paul East	RA-81-2H			RA-
house MWC-0034	2415 Minnehaha Ave. E	29	22	36	NENW	Lake Elmo	RA-81-2H			RA-
Carlson Auto MWC-0067	275 Century Ave N	29	22	36	SE-SE					RA-
CITY/TOWNSHIP: St. Paul										
9145 5955	I 94 WB	29	22	36	SW-SW	St. Paul East				RA-SPC-
9146 5956	I 94 EB	29	22	36	SE-SE	St. Paul East				RA-SPC-

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2376	2344	2407	2411	2416	2392
Vehs Exited	2374	2342	2407	2396	2415	2388
Starting Vehs	19	26	34	22	22	21
Ending Vehs	21	28	34	37	23	28
Travel Distance (mi)	656	642	649	650	666	652
Travel Time (hr)	28.7	28.0	27.2	27.7	28.8	28.1
Total Delay (hr)	7.3	6.9	6.1	6.6	7.1	6.8
Total Stops	553	580	526	567	548	554
Fuel Used (gal)	24.4	23.6	23.5	23.9	24.6	24.0

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2376	2344	2407	2411	2416	2392
Vehs Exited	2374	2342	2407	2396	2415	2388
Starting Vehs	19	26	34	22	22	21
Ending Vehs	21	28	34	37	23	28
Travel Distance (mi)	656	642	649	650	666	652
Travel Time (hr)	28.7	28.0	27.2	27.7	28.8	28.1
Total Delay (hr)	7.3	6.9	6.1	6.6	7.1	6.8
Total Stops	553	580	526	567	548	554
Fuel Used (gal)	24.4	23.6	23.5	23.9	24.6	24.0

100: 8th Street & Innovation Performance by movement

Movement	EBT	EBR	NBR	SBL	SBT	All
Stop Del/Veh (s)	0.0	0.0	0.0	5.3	5.4	0.6
Vehicles Entered	558	308	359	29	125	1379
Vehicles Exited	558	307	358	30	124	1377
Hourly Exit Rate	558	307	358	30	124	1377
Input Volume	570	310	365	30	125	1400
% of Volume	98	99	98	100	99	98

200: 8th Street & North Lot Access Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	16.5	20.0	2.6	19.7	18.8	4.6	3.0	0.1	0.1	2.9	0.2	0.2
Vehicles Entered	11	6	5	9	3	6	62	344	142	131	291	10
Vehicles Exited	11	6	5	9	3	6	62	344	141	130	290	10
Hourly Exit Rate	11	6	5	9	3	6	62	344	141	130	290	10
Input Volume	10	5	5	10	5	5	60	351	150	125	300	10
% of Volume	110	120	100	90	60	120	103	98	94	104	97	100

200: 8th Street & North Lot Access Performance by movement

Movement	All
Stop Del/Veh (s)	1.2
Vehicles Entered	1020
Vehicles Exited	1017
Hourly Exit Rate	1017
Input Volume	1036
% of Volume	98

300: 8th Street & South Lot Acces Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Stop Del/Veh (s)	84.2	6.2	0.0	0.0	15.1	0.2	4.0
Vehicles Entered	8	9	539	353	272	32	1213
Vehicles Exited	8	9	538	354	271	32	1212
Hourly Exit Rate	8	9	538	354	271	32	1212
Input Volume	10	10	551	350	285	30	1236
% of Volume	80	90	98	101	95	107	98

400: Hudson Road & 8th Street Performance by movement

Movement	WBT	WBR	SBR	All
Stop Del/Veh (s)	0.0	0.0	0.2	0.0
Vehicles Entered	421	893	35	1349
Vehicles Exited	420	892	35	1347
Hourly Exit Rate	420	892	35	1347
Input Volume	425	900	40	1365
% of Volume	99	99	88	99

Total Network Performance

Stop Del/Veh (s)	3.0
Vehicles Entered	2392
Vehicles Exited	2388
Hourly Exit Rate	2388
Input Volume	7457
% of Volume	32

Intersection: 100: 8th Street & Innovation

Movement	EB	EB	SB	SB
Directions Served	T	T	L	T
Maximum Queue (ft)	30	6	46	81
Average Queue (ft)	1	0	20	42
95th Queue (ft)	12	4	46	65
Link Distance (ft)	582	582		277
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			60	
Storage Blk Time (%)			0	1
Queuing Penalty (veh)			0	0

Intersection: 200: 8th Street & North Lot Access

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	L	T	R	L	T
Maximum Queue (ft)	39	22	29	21	50	43	29	74	29
Average Queue (ft)	12	3	9	4	17	2	3	30	3
95th Queue (ft)	34	17	29	16	42	17	13	58	21
Link Distance (ft)	160	160	186	186		230			411
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)					120		180	200	
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 300: 8th Street & South Lot Acces

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	T	L	T
Maximum Queue (ft)	47	31	38	204	6
Average Queue (ft)	10	7	2	93	0
95th Queue (ft)	37	29	23	164	4
Link Distance (ft)	191	191	355	230	230
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 400: Hudson Road & 8th Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 1

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1481	1447	1440	1498	1480	1469
Vehs Exited	1490	1448	1435	1499	1491	1472
Starting Vehs	19	16	11	12	21	13
Ending Vehs	10	15	16	11	10	11
Travel Distance (mi)	356	348	345	356	356	352
Travel Time (hr)	15.5	14.3	14.6	14.6	14.9	14.8
Total Delay (hr)	3.6	3.0	3.2	3.0	3.2	3.2
Total Stops	950	868	922	895	932	911
Fuel Used (gal)	15.9	15.1	15.1	15.4	15.6	15.4

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1481	1447	1440	1498	1480	1469
Vehs Exited	1490	1448	1435	1499	1491	1472
Starting Vehs	19	16	11	12	21	13
Ending Vehs	10	15	16	11	10	11
Travel Distance (mi)	356	348	345	356	356	352
Travel Time (hr)	15.5	14.3	14.6	14.6	14.9	14.8
Total Delay (hr)	3.6	3.0	3.2	3.0	3.2	3.2
Total Stops	950	868	922	895	932	911
Fuel Used (gal)	15.9	15.1	15.1	15.4	15.6	15.4

100: 8th Street & Innovation Performance by movement

Movement	EBT	EBR	NBT	NBR	SBL	SBT	All
Stop Del/Veh (s)	0.0	0.0	0.1	0.2	2.6	2.7	0.3
Vehicles Entered	141	15	1	463	8	26	654
Vehicles Exited	141	15	1	463	8	27	655
Hourly Exit Rate	141	15	1	463	8	27	655
Input Volume	155	15	1	460	10	30	671
% of Volume	91	100	100	101	80	90	98

200: 8th Street & North Lot Access Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	All
Stop Del/Veh (s)	5.3	16.5	4.7	9.6	7.3	4.8	0.1	0.4	1.5	0.2	0.2	3.2
Vehicles Entered	11	3	13	113	5	129	6	323	5	29	8	645
Vehicles Exited	11	3	13	113	5	129	6	323	5	29	8	645
Hourly Exit Rate	11	3	13	113	5	129	6	323	5	29	8	645
Input Volume	10	5	15	110	5	130	10	320	5	30	10	655
% of Volume	110	60	87	103	100	99	60	101	100	97	80	98

300: 8th Street & South Lot Acces Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Stop Del/Veh (s)	5.1	3.5	0.0	0.0	0.4	0.4	3.2
Vehicles Entered	248	302	26	12	3	153	744
Vehicles Exited	249	303	26	12	3	153	746
Hourly Exit Rate	249	303	26	12	3	153	746
Input Volume	255	305	30	10	5	151	756
% of Volume	98	99	87	120	60	101	99

400: Hudson Road & 8th Street Performance by movement

Movement	WBT	WBR	SBT	SBR	All
Stop Del/Veh (s)	0.0	0.0	1.5	0.4	0.2
Vehicles Entered	414	38	1	399	852
Vehicles Exited	415	38	1	399	853
Hourly Exit Rate	415	38	1	399	853
Input Volume	415	40	1	405	861
% of Volume	100	95	100	99	99

Total Network Performance

Stop Del/Veh (s)	3.4
Vehicles Entered	1469
Vehicles Exited	1472
Hourly Exit Rate	1472
Input Volume	4443
% of Volume	33

Intersection: 100: 8th Street & Innovation

Movement	SB	SB
Directions Served	L	T
Maximum Queue (ft)	31	35
Average Queue (ft)	7	17
95th Queue (ft)	28	42
Link Distance (ft)		277
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	60	
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Intersection: 200: 8th Street & North Lot Access

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	L	T	R
Maximum Queue (ft)	35	27	101	82	9	35	22	4	5
Average Queue (ft)	11	8	41	31	0	5	2	0	0
95th Queue (ft)	33	26	77	61	5	24	13	2	4
Link Distance (ft)	160	160	186	186		230		411	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)					120		200		225
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 300: 8th Street & South Lot Acces

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	T	L	T
Maximum Queue (ft)	126	128	4	6	29
Average Queue (ft)	59	60	0	0	2
95th Queue (ft)	97	98	3	4	16
Link Distance (ft)	191	191	355	230	230
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 400: Hudson Road & 8th Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0